



Finding of No Significant Impact October 2003



Project to Replace the Failing Wastewater Treatment Facility

**Wind Cave
National Park • South Dakota**

FINDING OF NO SIGNIFICANT IMPACT
Project to Replace the Failing Wastewater Treatment Facility
Wind Cave National Park, South Dakota

Wind Cave National Park is located in western South Dakota, on the southern edge of the Black Hills. The park was established in 1903 to protect Wind Cave from commercial exploitation. Since the original designation, the purpose of the park has been expanded from cave preservation alone to protection of both surface and subsurface resources. Wind Cave remains as one of the park's primary features and is recognized worldwide as a significant site. The Visitor Center receives about 110,000 visitors annually, with 95,000 entering the cave for ranger-led tours.

The park's wastewater treatment lagoons are: undersized to accommodate the wastewater generated by park facilities, situated over potential cave resources, and constitute a visual intrusion on the park landscape. The evaporation ponds are at the base of a west-facing slope within Wind Cave Canyon and are partially protected from wind and sun, reducing the effectiveness of evaporation. Typical annual inflow to the ponds consists of 2.5 million gallons of wastewater and 1.6 million gallons of rainfall. Evaporation rates are not sufficient to remove this total annual input.

Over the past 12 years, the ponds have filled to capacity three times. Effluent was discharged onto "spray fields" within the park. This process requires an emergency discharge permit from the South Dakota Department of Environment and Natural Resources. The state has notified the park that such permits will likely no longer be issued, and that a permanent resolution for the park's wastewater problem must be found. The park has taken measures to reduce wastewater generation throughout the park. Despite these efforts, the lagoons will likely reach capacity in 2005.

Although no cave passages have been found directly below the current lagoons, it is likely that cave resources exist at this location and wastewater leakage could destroy these resources. Water quality testing within the cave has revealed presence of contaminants found in untreated wastewater, resulting in remedial actions from other park operations.

The park analyzed three options for replacing the failing wastewater treatment facility:

- Construct a new pipeline to transmit untreated sewage to Hot Springs for treatment (the preferred alternative);
- Construct a wastewater treatment plant that discharges treated water under a National Point Discharge Elimination System (NPDES) permit; or
- Construct new, larger evaporation ponds in a location that does not restrict size and allows for greater evaporation rate to fully remove inputs of wastewater and precipitation.

Unlike the no action alternative, the action alternatives ensure adequate treatment of current and projected future flows of wastewater from the Wind Cave facilities. Implementation of any of the action alternatives would result in beneficial impacts to natural resources and the human environment at the park.

PREFERRED ALTERNATIVE

Under the preferred alternative, a wastewater transmission line will be installed to convey the park's sewage to Hot Springs, SD for treatment. A new lift station (pump unit) and emergency retention structure will be placed in the maintenance area. The retention structure would hold up to two days sewage, and would allow for continuation of service during routine maintenance or repair operations..

The new wastewater main will be routed along the Highway 385 right-of-way, and will connect with the city's sewage collection system at the north end of town. The total distance of the installation is approximately 9.8 miles.

A 4 to 6-inch diameter force main (pressurized pipeline) will be installed for approximately 4 miles within the park. Along the main, air and vacuum release valves and pressure cleanouts will be installed to permit routine operations and maintenance. The pipe will be made of high density polyethylene with fused joints. This material is durable and flexible, and with sound installation will ensure a leak free pipeline.

Once the pipeline is in operation, leak detection will be accomplished by continuous pressure monitoring and regular periodic review of monitoring wells. If a leak in the line within the park is suspected, portable acoustic leak detection equipment will be used to locate the leak for repair.

Installation of the main will be accomplished using traditional trenching techniques. A 30-foot wide corridor will be disturbed, and the piping will be placed at a minimum depth of 5 feet to avoid freezing and allow vault installation.

Approximately 37 acres will be disturbed by construction of the preferred alternative. About 15 acres are within the boundary of Wind Cave National Park, with the remaining 22 outside the park. Disturbed areas will be revegetated with appropriate species.

The existing 5-acre wastewater lagoon site will be regraded and planted with a mixture of native grasses and forbs.

Discussions with Hot Springs have resulted in a proposal from the City to design and construct 5.7 miles of gravity sewer between town and the park boundary. The park and the City would both benefit from this arrangement, and contract negotiations are ongoing. Under this proposal, the National Park Service would pay for construction of this segment, and the City would own and operate it upon completion. The National Park Service will pay a monthly sewer use fee to the City, as do other commercial users. Design and construction of the wastewater main by the City of Hot Springs would not affect the resource impacts described in the environmental assessment.

Once the park's wastewater reaches the municipal plant, it will be treated with the city's sewage, in full compliance with South Dakota Department of Environment and Natural Resources regulations for water pollution control.

OTHER ALTERNATIVES CONSIDERED

The choice of taking no action, along with analysis of all design options led to the dismissal of several alternatives that failed to meet the project objectives or generated unacceptable levels of disturbance.

New Wastewater Treatment Facility with Surface Discharge. This option would have treated the park's wastewater with a "package plant" and discharged the effluent into the Wind Cave Canyon drainage. A National Discharge Elimination System (NPDES) permit would be required, and licensed operators would manage the system. This option would have eliminated periodic spray irrigation and removed the visual intrusion of the lagoons. However, discharge of effluent would not eliminate the potential for treated wastewater to affect cave resources. Discharged effluent contains residual disinfectant components. The effluent would also be an unnatural water source that would adversely affect surface ecology, as it would increase surface flows.

Relocate Lagoons to New Site. In order to use non-discharging lagoon treatment, larger lagoons would have been constructed on a hilltop north and east of the existing lagoons. The new, 14-acre ponds would have an impervious liner and would allow full evaporation of annual sewage flows. A one lane gravel service road would provide access to the new site. This option would treat the

park's wastewater. However, the potential for pollution to affect cave resources or reach the water well were not eliminated. Lagoons draw wildlife, and special protective measures would be needed to keep out bison and elk. In addition, the site is visible from popular hiking areas, and this could continue to affect visitor experience.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

As stated in Section 2.7.D of *Director's Order #12 and Handbook*, the environmentally preferred alternative is the alternative that would promote the national environmental policy expressed in the National Environmental Policy Act (NEPA) (Sec. 101 (b)). This includes alternatives that:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
- Ensure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings.
- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.
- Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
- Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The preferred alternative fully addresses these six criteria and meets the park's need to implement a long-term solution to their wastewater treatment needs. This alternative provides the best protection of cave resources by removing wastewater from the park and minimizing the potential for nutrient-rich water to enter delicate cave systems. This option also enhances protection of public health and safety by removing untreated wastewater from the park. The visual impact of the existing lagoon facility is removed. In addition, this alternative would not result in creation of artificial environments, and would not produce long-term disturbance within Wind Cave National Park. Therefore, the preferred alternative is the environmentally preferred alternative.

THE PREFERRED ALTERNATIVE AND SIGNIFICANCE CRITERIA

As defined in 40 CFR §1508.27, significance is determined by examining the following criteria:

Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

Implementation of the preferred alternative will produce long-term beneficial effects on both the human and natural environment. Reducing the potential for nutrients to affect cave resources will provide long-term, minor benefits. Cave resources will be better protected, ensuring enjoyment by future generations. In addition, the wastewater treatment provided by the town of Hot Springs will be fully compliant with state and federal requirements. The possibility for the park to violate water quality regulations will be eliminated. This will benefit park operations by alleviating the need to apply for emergency discharge permits and install temporary irrigation systems.

No significant adverse effects will occur as a result of implementing the preferred alternative. Installation of the wastewater main will generate negligible to minor adverse effects only during construction activities. Air quality will be negligibly affected by fugitive dust and exhaust from equipment. Soils and vegetation will be temporarily disturbed, but no surface disturbance will

occur outside previously disturbed areas. The existing lagoon site will be rehabilitated and planted with native vegetation. Wildlife will be adversely affected in negligible to minor way by noise levels. This may cause wildlife to avoid Highway 385 corridor during the construction period.

The degree to which the proposed action affects public health or safety

Public health and safety was an important issue addressed during development of the preferred alternative. Removing the existing wastewater lagoons eliminates the risk of contaminating the park's drinking water wells with nutrients or microbes found in wastewater. This will result in long-term moderate benefits to public health and safety.

Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas

There are no prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas within the project area. However, as described in the environmental assessment, the biotic systems of caves are highly specialized, and impacts to these resources are considered long-term. Although the park's cave resources have not been designated as ecologically critical areas, the unique nature of their ecosystem warrants a high level of protection. Increased nutrients from wastewater can threaten sensitive biota and delicate formations within the caves.

The historic Civilian Conservation Corps (CCC) park facilities are outside the project area and would not be affected by the proposed action. With identified mitigation measures, the project would have no adverse effects to archeological, historic, ethnographic, or cultural landscape resources at Wind Cave National Park.

The degree to which the effects on the quality of the human environment is likely to be highly controversial

There were no controversial impacts identified during the analysis done for the environmental assessment. Some local controversy was generated during the public comment period through editorial comment and opinion. Substantive comments received are addressed in the "Errata Sheets" attached to this document.

Degree to which the possible effects on the quality of the human environment are highly uncertain or involve unique or unknown risks

The risks to the quality of the human environment associated with the preferred alternative would be negligible. There were no highly uncertain, unique, or unknown risks associated with implementation of the preferred alternative.

Degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration

The preferred alternative neither establishes a National Park Service precedent for future actions with significant effects nor would it represent a decision in principle about a future consideration.

Whether the action is related to other actions with individually insignificant but cumulatively significant impacts

Implementation of the preferred alternative will contribute long-term, minor to moderate beneficial effects for cave systems, public health and safety, and local surface water quality.

The preferred alternative will not significantly impact the surface resources of Wind Cave National Park. Any adverse effects, in conjunction with the adverse impacts of any other past, present, or reasonably foreseeable future actions, will result in negligible to minor cumulative impacts to soils, vegetation, wildlife, and cultural and ethnographic resources.

Degree to which the action may adversely affect districts, sites, highways, structures, or objects listed on National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources

Implementation of the preferred alternative will have no effect on known prehistoric or historic archeological resources. The project area has been excavated and disturbed for highway construction, utility corridor installation, and other development. Thus, any artifacts found in these areas would lack provenience. Mitigating measures described in the environmental assessment, including monitoring, would help ensure protection of *in situ* archeological resources in the unlikely event any are uncovered by construction.

As stated above, the historic CCC structures in the park would not be affected by the proposed action. With identified mitigation measures, the project would have no adverse effects to archeological, historic, ethnographic, or cultural landscape resources at Wind Cave National Park.

As confirmed by an April 18, 2003 letter received from the South Dakota State Historic Preservation Officer, State Historical Society, the preferred alternative would have no adverse effect to historic properties.

Degree to which the action may adversely affect an endangered or threatened species or its critical habitat

There will be no effect to threatened or endangered species as a result of implementation of the preferred alternative because no federally listed species occur in the project area. The U.S. Fish and Wildlife Service was contacted regarding this project, and the Service agreed with the park's finding of no effect on threatened and endangered species.

Whether the action threatens a violation of Federal, state, or local environmental protection law

The preferred alternative represents a long-term solution for the park's wastewater management and would not violate any federal, state, or local environmental protection laws.

Impairment

In addition to reviewing the list of significance criteria, the National Park Service has determined that implementation of the preferred alternative would not constitute an impairment to Wind Cave National Park resources and values. This conclusion is based on a thorough analysis of the environmental impacts described in the project's environmental assessment, relevant scientific studies, and the professional judgment of the decision-maker guided by the direction in National Park Service Management Policies. Although implementation of the project would cause short-term, localized adverse effects, in all cases these result from actions taken to preserve vital park resources. Overall, implementation of the preferred alternative would result in benefits to cave resources, public health and safety, and local water quality. Implementation of the Project to Replace the Failing Wastewater Treatment Facility at Wind Cave National Park would not result in impairment of any park resources or values.

PUBLIC INVOLVEMENT AND CONSULTATION

National Park Service internal discussions led to identification of the main issues to be addressed in this environmental assessment. Protection of park resources and compliance with state and federal wastewater regulations are the primary objectives of the Project to Replace the Failing Wastewater Treatment Facility. To obtain public input on the proposed project, an open house was held at the park on April 24, 2003. Seven interested parties listed their attendance on the sign-in sheet.

Several Native American Tribes have demonstrated interest in the areas within Wind Cave National Park. The following tribes and tribal representatives received copies of the environmental assessment for review and comment.

Arapaho Business Committee	Oglala Sioux Tribal Council
Cheyenne River Sioux Tribe	Ponca Tribe of Nebraska
Cheyenne-Arapaho Tribes of Oklahoma	Rosebud Sioux Tribal Council
Crow Creek Sioux Tribal Council	Santee Sioux Tribal Council
Crow Tribal Council	Shoshone Business Committee
Flandreau Santee Sioux Executive Committee	Sisseton-Wahpeton Sioux Tribal Council
Fort Belknap Community Council	Spirit Lake Tribal Council
Fort Peck Tribal Executive Board	Standing Rock Sioux Tribe
Lower Brule Sioux Tribal Council	Three Affiliated Tribes Business Council
Northern Cheyenne Tribal Council	Yankton Sioux Tribal Council

No comments on the environmental assessment were received from the tribes.

During development of this environmental assessment, the park contacted the South Dakota Historic Preservation Officer (SHPO). In a letter dated April 18, 2003, the SHPO concurred with the park's determination that no historic properties would be affected under Alternative B, the preferred alternative.

The U.S. Fish and Wildlife Service was contacted, and agreed with the park's finding of no effect on threatened and endangered species.

The environmental assessment was posted on the Wind Cave National Park website on March 31, 2003. The public review period was closed on May 15, 2003. The document was also mailed to a recipient list of state and local agencies and interested parties. The responses to public comment are summarized in the attached Errata Sheets.

CONCLUSION

The preferred alternative would not constitute an action that normally requires preparation of an environmental impact statement (EIS). The preferred alternative would not have a significant effect on the human environment. Negative environmental impacts that could occur are short-term and of negligible to minor in intensity. There would be no significant impacts on public health, public safety, threatened or endangered species, or other unique characteristics of the region. There are no unmitigated adverse impacts on sites or districts listed in or eligible for listing in the National Register of Historic Places. No uncertain or controversial impacts, unique risks, significant cumulative effects, or elements of precedence were identified. Implementation of the action would not violate any federal, state, or local environmental protection law nor would it result in the impairment of park resources or values.

Based on the foregoing, it has been determined that an EIS is not required for this project and thus will not be prepared.

Recommended:

Superintendent

Date

Approved:

Midwest Regional Director

Date

ERRATA SHEETS
Project to Replace the Failing Wastewater Treatment Facility
Environmental Assessment
Wind Cave National Park

The environmental assessment for the Project to Replace the Failing Wastewater Treatment Facility at Wind Cave National Park was on public review for 30 days, ending May 15, 2003. A total of seven letters and two signed petitions were received during the review period. Comments were analyzed consistent with the guidance provided in the National Park Service's *Director's Order 12*, the NPS guideline for environmental compliance. Comments are considered substantive when they: a) question, with reasonable basis, the accuracy of information in the draft environmental assessment, b) question, with reasonable basis, the adequacy of the environmental analysis, c) present reasonable alternatives other than those presented in the draft environmental assessment, or d) cause changes or revisions in the proposal. Comments that state a preference for one alternative (or component of an alternative), state opinions, or are outside the scope of the project, are not considered substantive.

The park received six letters from the public that opposed replacing the failing wastewater facility, and two letters in support of the preferred alternative.

Two letters with multiple substantive comments were submitted during the public review period. The issues raised in these letters are addressed below in "Response to Comments." Three identical petitions with a total of 47 signatures were received which opposed implementation of the project.

NPS editorial review and further engineering design resulted in two changes to the environmental assessment. These are listed in "Changes in the Environmental Assessment Text," below. The combination of the environmental assessment and these errata sheets form the complete and final record on which the Finding of No Significant Impact is based.

One individual questioned the adequacy of leak detection for the project. Based on this concern, the park has developed an enhanced leak protection program for the wastewater system. Revisions to the text of the environmental assessment resulting from these design improvements are addressed in the revised description of the preferred alternative, below

Comments were also received requesting clarification of information presented in the environmental assessment. These questions did not result in editorial changes to the environmental assessment. Responses to public and agency inquiries are addressed in the "Response to Public Comment" section, below.

CHANGES IN THE ENVIRONMENTAL ASSESSMENT TEXT

The Preferred Alternative, pages 14 and 15; replace with the following text.

ALTERNATIVE B, THE PREFERRED ALTERNATIVE

Under the preferred alternative, a wastewater transmission line will be installed to convey the park's sewage to Hot Springs, SD for treatment. A new lift station (pump unit) will be placed in the maintenance area. At the lift station, an emergency retention structure will be installed to allow continuation of services during maintenance and repair operations. The retention structure would hold up to two days sewage at the maximum daily flow rate, and more during other periods.

The new main will be routed along and within the Highway 385 right-of-way, and will connect with the city's sewage collection system, west of Highway 385 at the north end of town. The total distance of the installation is approximately 9.8 miles.

A 4 to 6-inch diameter force main (pressurized pipeline) will be installed for the 4.1 miles between park headquarters and the south boundary of the park. Along the forced main, air and vacuum release valves will be installed in standard manholes to provide a means of controlling air in the pipeline to facilitate pumping and draining of the forced main. At a spacing of about 300 feet, uniformly throughout the length of the forced main, pressure cleanouts will be installed to facilitate cleaning and maintenance of the pipeline. Pipe material for the force main will be high density polyethylene with butt fusion welded joints. This material will provide flexibility in shifting soils and prevent root intrusion and leak development. Extensive quality control and inspection during construction will ensure installation of a leak free pipeline. Once the pipeline is in operation, the static pressure at the park's lift station will be monitored as a means of leak detection. If the static pressure in the forced main drops below normal, an alarm notification will be sent to the system operator. Additionally, piezometers (monitoring wells) and cutoff walls installed in the trench along the length of the pipeline within the park will be monitored for the presence of wastewater. If a leak in the line within the park is suspected, portable acoustic leak detection equipment will be used to pinpoint the location of the leak so that it can be efficiently repaired.

Installation of the forced main will be accomplished using traditional trenching techniques. A corridor, approximately 30 feet wide, will be disturbed in order to excavate the trench and allow room for associated construction activities. The pipe will be placed at a depth to avoid freezing and to allow adequate clearances for venting vaults – a minimum depth of 5 feet below the surface in this climate.

Ongoing consultation with the City of Hot Springs has resulted in a change to the implementation of the preferred alternative. After publication of the environmental assessment, the Mayor contacted the park to propose that the City design and construct approximately 5.7 miles of sewer extension, between the city and the park boundary, to function as a conventional gravity sewer. The park and the City would both benefit from this arrangement, and at the time of this writing, negotiations for a utility contract between the National Park Service and the City are ongoing. Under this contract the National Park Service would pay the City to design and construct the portion of the system outside the park boundary. Upon completion, the City would own, operate and maintain this portion of the system and the National Park Service will pay a monthly sewer use fee at same rate charged other commercial users in the city, for the actual quantity of wastewater treated.

Design and construction of the wastewater main by Hot Springs would not affect the resource impacts described in the environmental assessment.

Approximately 37 acres will be disturbed by construction of the preferred alternative. Almost 15 acres are within the boundary of Wind Cave National Park and nearly 22 acres are outside the park. Disturbed areas will be regraded to original contour and revegetated. Native species will be planted within the park, and the South Dakota Department of Transportation will determine revegetation requirements outside the park.

The existing wastewater lagoons will be removed, and the site will be rehabilitated. This effort will restore approximately 5 acres to native vegetation. The area will be regraded to approximate the natural contours and planted with a mixture of native grasses and forbs.

The preferred alternative is possible because the town's Veterans Administration Hospital recently closed their on-site laundry facility. This reduced flows to the wastewater treatment

plant. Hot Springs currently treats approximately 550,000 gallons of wastewater per day. The park's contribution of 25,000 gallons per day, maximum, is about 5 percent of current flow.

Once the park's wastewater reaches the municipal plant, it will be treated with the city's sewage, and discharged on a spray irrigation field, located above the Cheyenne River, east of town. Two-hundred acres of privately owned hay and forage are irrigated with the treated effluent. This discharge method is fully compliant with South Dakota Department of Environment and Natural Resources regulations for water pollution control.

The preferred alternative meets the park's need to provide a long-term solution to their wastewater treatment needs. This alternative protects cave resources by creating less impact than the other alternatives considered. In addition, this alternative provides a long-term solution to park wastewater treatment needs and will also aid the local community in protecting the area watershed. Although the proposed sewer line will cross over known cave passages, the leak detection system, long-life piping, and the relatively thick overburden covering the Madison Limestone formation will combine to help insulate cave resources from potential leaks and contamination. This alternative also protects public health by eliminating the potential for nutrient-rich water to enter the park's water wells. The visual intrusion of the existing lagoon site will be removed. Park maintenance and operation burdens will be reduced, and an existing facility will be used for wastewater treatment. In addition, this alternative will not create artificial environments, and will not produce long-term disturbance within Wind Cave National Park.

Page 47, paragraph 4, sentences 3 and 4; replace these two sentences with the following text:

The association of these findings with the presence of components commonly found in wastewater was further supported by cave water quality testing performed after installation of double-walled piping for the sewage transmission network. Once double-walled piping was in place, cave waters no longer carried elevated quantities of pollutants commonly found in untreated wastewater.

RESPONSE TO COMMENTS

One comment was received questioning the range of alternatives addressed in the environmental assessment. The commenter noted that reducing the number of park staff living in the park would lessen the quantity of wastewater generated. This commenter also made reference to reduction or elimination of housing at Carlsbad Caverns and at Jewel Cave to reduce aboveground impacts to the cave system.

The park agrees that reducing the number of park residents would decrease the demands made on the wastewater treatment facility. The park also acknowledges the prudence of reducing aboveground sources of impacts to the cave system. However, protection of cave resources was not the sole objective of the project to replace the failing wastewater treatment facility.

Two other primary objectives of the project were to reduce the visual effects of the existing facility on visitors and to protect public health and safety. Retention of the lagoons does not address either of these concerns. In addition, the continued presence of the lagoons does not protect the environment (or the cave) from leaks or breaches of the liner that could release large quantities of untreated wastewater adjacent to the highway.

The housing needs for Wind Cave staff are determined by periodic development of a Housing Management Plan (HMP). The need for the current number of in-park housing units has been described in the park's current HMP, based on availability of housing in the vicinity (for both year-round and seasonal workers), housing demands placed on park infrastructure, and the

need for resource protection within the park. Such resource protection positions include cave, wildlife and vegetation technicians, and seasonal law enforcement rangers.

The park now houses a total of five permanent park employees and four dependents in staff housing. These employees include two required law enforcement ranger occupants, one resource protection technician, and one interpretive ranger. 32 bedrooms are available for seasonal (summer) staff, and these are filled each year. Seasonal workers are essential to staffing and managing the park during high visitation. There is no short-term (6 months or less) housing available in Hot Springs or Custer. These workers can not live in motels for an extended period due to cost and lack of kitchen facilities. Therefore, housing must be provided for these employees.

The park made inquiries within the NPS regarding the status of housing at Carlsbad Caverns and Jewel Cave. In 2002, Carlsbad housed three permanent staff and 18 seasonal and volunteer personnel within the park. Jewel Cave does not house permanent staff in the park, but did have eight seasonal employees living in the park in 2002.

In addition, several of the Wind Cave housing units are historic Civilian Conservation Corps buildings, constructed in the 1930s and 1940s. These structures are included in the parks' Administrative and Utility Historic District, which is listed on the National Register of Historic Places. The maintenance and protection of these structures is best served by retention as residences.

Comments were also received regarding leak detection and spill prevention for the project. One individual expressed concern for protection of cave resources, suggesting use of dual-walled piping and enhanced leak detection. The South Dakota Department of Environment and Natural Resources expressed the need to protect groundwater from the effects of potential leaks.

As described in the environmental assessment (page 50), the wastewater main will pass over known cave formations in three locations. At these locations, the trench line will be separated from the Madison limestone by a thick overburden of the Minnelusa formation – Permian sandstone with varying porosity. This formation is not impervious, but will act as a buffer to leaks.

The option of using dual-walled pipe for this project was considered and rejected during project design. Installation of dual-walled pipe requires complicated welding, which increases the potential for weld failure. In addition, modern single-wall pipe is very durable and long-lived. The park believes the current design is adequate, and that installation of dual-walled pipe would not enhance protection of cave resources.

The park agrees that accurate and rapid leak detection is critical to park resource and groundwater protection. To address this concern, leak detection has been enhanced (see description of the preferred alternative, page 9, paragraphs 2 and 3 of this document).

Several questions relating specifically to issues addressed in the environmental assessment are addressed below for clarification.

What is the history of wastewater flows?

Wastewater flow into the lagoons has never been metered. The ponds have depth gauges and readings are periodically manually recorded. Stored and discharged volumes (in gallons) from 1989 to the present are as follows:

Date	Stored	Discharged
1989	1,566,671	
1990	2,455,101	
1991	3,286,459	
1992	3,732,012	
1993	3,069,198	1,600,000
1994	3,036,007	
1995	3,823,365	
1996	3,971,094	600,000
1997	4,070,635	
1998	4,320,092	
1999	3,665,238	2,575,800
2000	2,008,501	1,656,220
2001	1,757,274	
2002	2,396,795	
2003	3,036,316	

How much improvement was made by the installation of low flow toilets, shower heads, etc.?

Water savings from use of flow fixtures is difficult to quantify because none of the park buildings have individual water meters. The park meters water pumped from the well, but not all of this water ends up in the sewer system. A substantial amount is used to irrigate lawns, to control prescribed and wildland fire suppression, etc. Also, prior to replacement of the water system in 1999, a fair amount of water leaked out of the distribution lines before it reached the buildings.

Low-flow fixtures were installed between 1992 and 1994. The five-year average of water pumped from the well from 1987 to 1990 was 6,047,020 gallons per year. The average consumption for the five years following the conversion, 1995 to 1999, was 4,047,900 gallons for a difference of about 2 million gallons per year. We do not know how much of this can be attributed to the low flow fixtures. After replacing the headquarters water distribution system, our annual water use has dropped to 3,373,000 gallons in 2002.

How much extra flow are you getting from the campground? Are other water sources connected to the sewer?

The park supplied 253,700 gallons of water to the campground during the 2002 season. Not all of this returned in the sewer system, because many campground uses do not generate wastewater flows. Prior to the 2002 season, the campground restrooms used a septic system and were not connected to the lagoons.

Why has the park not applied for a permanent irrigation disposal permit?

1. The existing lagoons were intended to be non-discharging. However, experience has shown that the existing lagoons are undersized and that regular intermittent discharges are needed. Effluent from the park evaporation ponds would not meet water quality standards generally permitted for surface water discharge.

2. Even if permitted, continued, repetitive discharges of wastewater would be an unnatural water and nutrient source that could result in undesirable changes in the ecology of the area of discharge. If this water were to reach cave passages, which are not documented but believed to exist under the area of the existing lagoons and the area used for irrigation, it would have adverse impacts. This water could also infiltrate into the water table of the area and affect resources outside the park.
3. The park shares the concerns of the South Dakota Department of Environmental and Natural Resources that continued discharge of wastewater could have a detrimental affect on ground water quality.

Over how many acres was spray irrigation discharged?

Seven acres were irrigated in 1993, 1999, and 2000.

What is the legal description of the land that was used for irrigation discharge? What is the suitability of this land for use in future application?

SE 1/4, Section 1, T6S, R5E. This land is native, unbroken prairie and is fully contained within Wind Cave National Park. There is no evidence that these seven acres have been exposed to long-term adverse effects due to the irrigation. The land supports a healthy mixed-grass prairie and is a favored spot for bison and elk grazing.

One individual submitted a lengthy set of questions that included requests for additional information on the history and management of the existing wastewater treatment facility. The park has answered the majority of the commenter's questions on its website. See "Frequently Asked Questions Concerning the Wastewater Treatment Facility" at http://www.nps.gov/wica/FAQ_Waste-Water_Treatment.htm.